

tiostated at 1.0 volt versus RHE. The array also includes two heated noble metal filaments—one of platinum and one of rhodium—that function to oxidize or partially oxidize many compounds in air. The four sensors were switched at 30 second intervals to each of the following four operating modes: (a) platinum filament heated to about 850° C.; (b) rhodium filament heated to about 900° C.; (c) rhodium filament heated to about 1000° C.; and (d) both filaments off. In these four modes the four sensors provided a total of 16 independent data channels. Six separate samples of solid 1,6-hexanediamine were analyzed by the present device and the results show the high degree of precision with which materials may be reliably fingerprinted and thereby identified.

## EXAMPLE 2

### Identification of Liquid Mixtures of CCl<sub>4</sub> and Gasoline

The following five different mixtures of CCl<sub>4</sub> and gasoline correspond to the five bars in each channel of FIG. 9 respectively: (1) 100% CCl<sub>4</sub>, (2) 75% CCl<sub>4</sub> and 25% gasoline, (3) 50% CCl<sub>4</sub> and 50% gasoline, (4) 25% CCl<sub>4</sub> and 75% gasoline, and (5) 100% gasoline. These samples were analyzed using the same instrument under the same conditions as in Example 1. The responses shown in FIG. 9 are observed to vary from the pure CCl<sub>4</sub> pattern to the pure gasoline pattern. Intermediate patterns have elements of both constituents and can therefore be identified and quantified.

The foregoing description of embodiments of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed, and many modifications and variations will be obvious to one of ordinary skill in the art in light of the above teachings. The scope of the invention is to be defined by the claims appended hereto.

What is claimed is:

1. A method for identifying and quantifying at least one component of liquids and solids comprising the steps of:

changing a non-fluid sample to a fluid material, introducing said fluid material to an array of sensors for exposure of said fluid material to said sensors, said array including plural sensors having differing electrical responses to said fluid material which are dependent on the interaction of said fluid material with each of said sensors and upon either an operational condition of at least one of said sensors or at least one property of the fluid material,

changing an operational condition of at least one of said sensors or at least one property of the fluid material to provide a plurality of different responses from at least one of said sensors,

forming a response pattern from the responses of said sensors, and

comparing the formed response pattern with a set of previously established response patterns to identify at least one component of the liquids and solids.

2. A method in accordance with claim 1 wherein said step of changing a non-fluid sample comprises the steps of:

providing a non-fluid sample to a chamber having a heating element means therein, and heating said non-fluid sample to change it to a fluid material

3. A method in accordance with claim 2 wherein a said step of introducing said fluid material to an array of sensors comprises the steps of:

fluidly connecting said chamber with said array, and forcing said fluid material out of said chamber of said sensor array by introducing a fluid material into said chamber through a separate inlet.

4. A method for identifying and quantifying at least one component of gases and liquids comprising the steps of:

changing a gaseous sample to a liquid material, introducing the liquid material to an array of sensors for exposure of the liquid material to said sensors, said array including plural sensors having differing electrical responses to the liquid material which are dependent on the interaction of the liquid material with each of said sensors and either at least one property of the liquid material or and operational condition of at least one of said sensors

changing at least one property of the liquid material or an operational condition of at least one of said sensors to provide a plurality of different responses from at least one of said sensors,

forming a response pattern from the response of said sensors, and

comparing the formed response pattern with a set of previously established response patterns to identify at least one component of the liquid or gaseous material.

5. A method in accordance with claim 4 wherein said step of changing a gaseous material to a liquid material comprises the steps of:

providing a gaseous sample having a condensing means therein, and

condensing said gaseous sample to change it to a liquid material

6. A method in accordance with claim 5 wherein said step of introducing the liquid material to an array of sensors comprises the steps of:

fluidly connecting said chamber with said array, and forcing the liquid material out of said chamber to said sensor array by introducing a fluid material into said chamber through a separate inlet.

7. An instrument for identifying at least one component of gases, liquids and solids comprising,

means for changing solids to liquids or gases, or liquids to gases, said means including at least one heating element means for vaporizing liquids and solids, a block of heat resistant material having a chamber therein, a sample container to fit within said chamber along with said heating element, means such that said container is contacted with said heating element means, and means for sealing said chamber from the atmosphere;

sensing means including an array of sensors;

means for introducing the liquids or gases to said sensing means, said array including at least two sensors having different electrical responses to the liquids or gases dependent on the interaction of the liquids or gases with each of said sensors and upon an operational condition of at least one of said sensors,

means for changing an operational condition of at least one of said sensors to provide a plurality of different responses from said at least one sensor,

means for forming a response pattern from said sensing means upon exposure to a liquid or gaseous sample,